Home Energy Disaggregation Tool

User Guide

Home Performance with ENERGY STAR

The Home Energy Disaggregation Tool has been created as a preliminary tool for participating contractors to use when evaluating a homeowner's energy profile. This tool is not a substitute for full-fledged energy modeling software. There are some limitations, such as not being able to input multiple heating zones that have different fuel types. While this user guide provides an overview of some of the capabilities of the disaggregation tool, technical support will not be available.

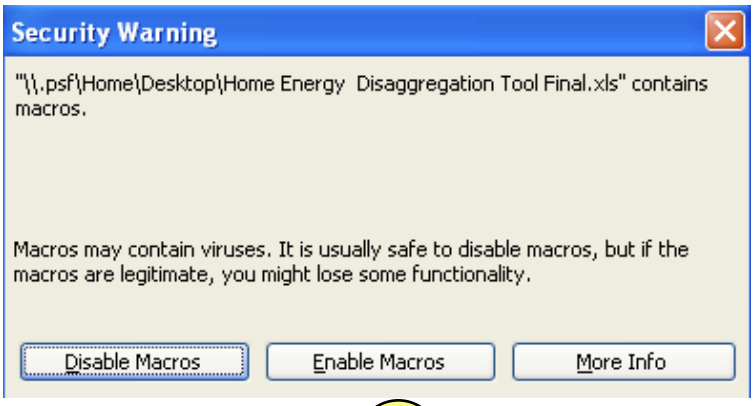
Participating contractors should use the disaggregation tool as one means to evaluate a home's performance. Further investigation and testing will provide additional insight that may make this tool's assumptions invalid.

We have found that this tool is best used as a means to open dialogue between the contractor and the homeowner - not to provide a definitive statement about a specific energy profile.

Opening the Disaggregation Tool

- The Home Energy Disaggregation Tool has been developed using Microsoft Excel 2003. When you open the file, you will see a Security Warning window.

A **Select "Enable Macros".** If not selected, the file will open but the tool will not function correctly.



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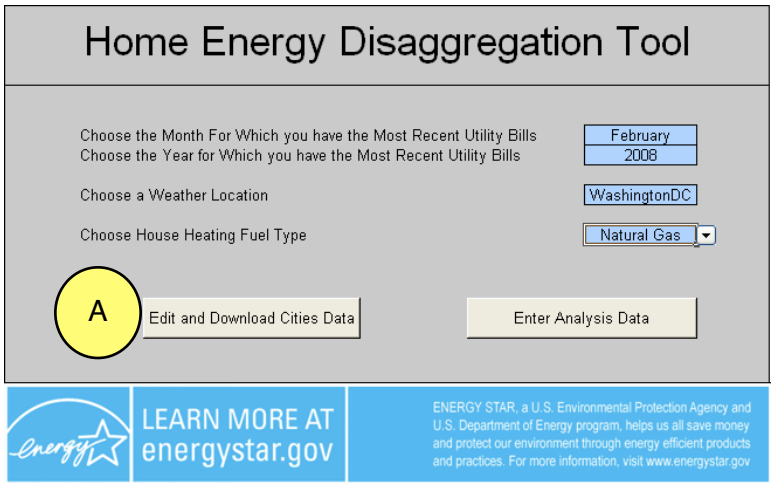
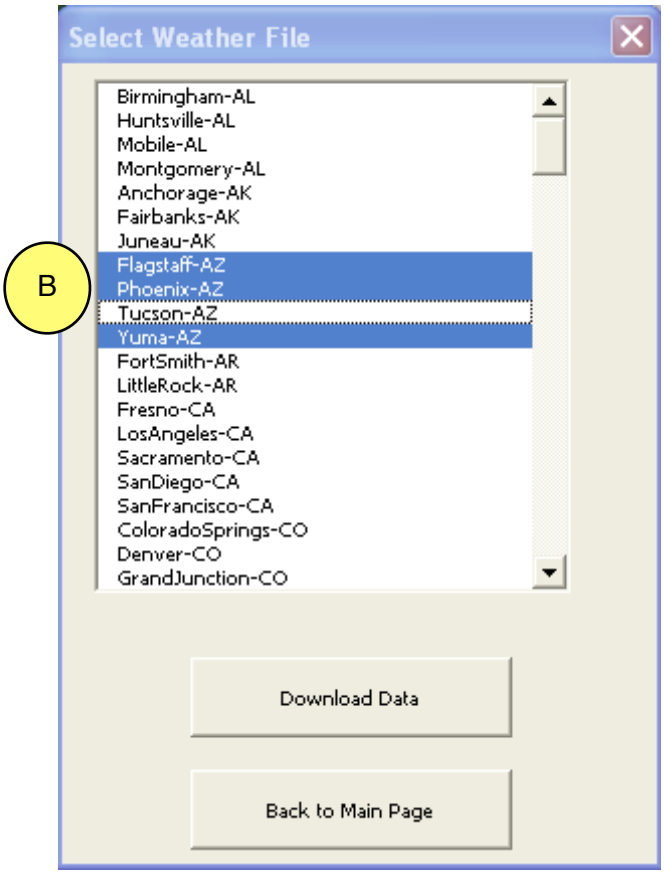
Preparation for Entering Homeowner Data

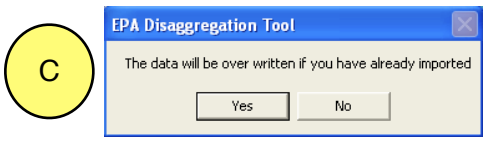


- Since most contractors don't need the weather data for the entire country (and don't want to scroll down a long list), the Disaggregation tool will store favorite weather locations. If you need to change your "Weather Location" information, select the "Edit and Download Cities Data" button. A

- Select the cities you wish to have in your customized "Weather Location" pull-down menu. B



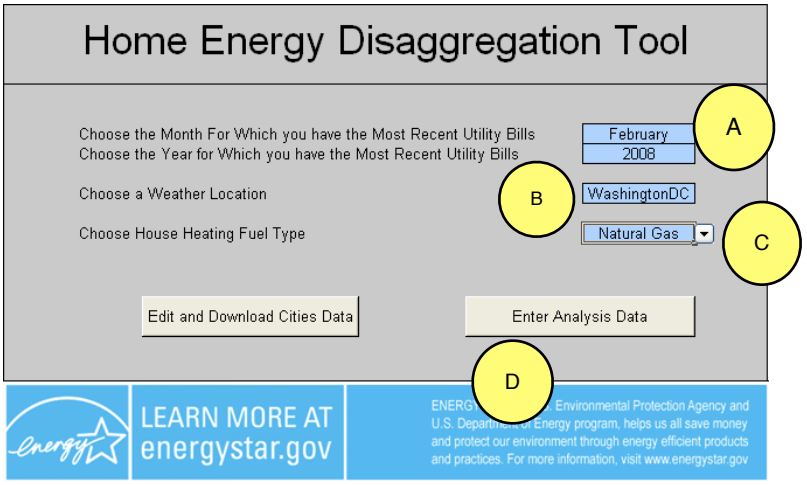
- Please note that existing weather locations will be replaced. In these screenshots, the original "Washington, D.C." location will be erased, unless you also re-select "Washington, D.C." from the "Select Weather File" window. You will see a warning window to remind you that data will be overwritten. C



Preliminary Step

Reviewing your homeowner's bills, find the most recent bill month and the heating fuel type.

- Enter the most recent month and year into appropriate fields. (A)
- Select the weather location from your customized pull-down list. (B)
- Enter the heating fuel type. (C)
- Select the "Enter Analysis Data" button. (D)



You will now see a new screen to enter the analysis data. This screen consists of several steps.

Utility Bill Disaggregator For Homes Heated with Natural Gas

Step 1: Enter Utility Rates & Consumption Data

Month	Year	Electric Consumption (kWh)	Natural Gas Consumption (Therms)	kWh Rank	Therms Rank
Utility Rate ($)		$0.15	$1.50		
February	2008	520	172	7	1
January	2008	560	116	6	2
December	2007	650	112	5	3
November	2007	360	48	12	6
October	2007	370	14	11	9
September	2007	770	14	4	10
August	2007	1,060	13	1	11
July	2007	900	13	2	12
June	2007	800	15	3	8
May	2007	420	18	9	7
April	2007	410	58	10	5
March	2007	490	97	8	4
Annual		7,310	690	2,990	

Step 1

- Use the utility bills to determine the utility rate and enter consumption values for the given months. If there are different utility rates from month-to-month or for different levels of consumption, use a best estimate.
- Natural gas can be entered in therms and CCF.
- Oil and propane can be entered in gallons and pounds. Oil and propane do not need to be entered month-to-month; annual consumption totals need to be entered.

Step 2

- Review the months that have been selected. If one month appears to be an outlier (e.g. kWh usage plummets in August because the family may have taken an unusually long vacation), choose not to use that month's data. In our sample, energy consumption patterns appear to be reasonable, so all fields are "yes".

Step 2: Review & Select Baseload Months

Use In Baseload	Month	Value (kWh)
Yes	November	360
Yes	October	370
Yes	April	410
Baseload Using Selected Months		380

Use In Baseload?	Month	Value (Therms)
Yes	July	13
Yes	August	13
Yes	September	14
Baseload		13

Entering Homeowner Data

Step 3

- Fill out the survey of household characteristics as closely as possible. A best estimate will suffice. Use the drop down menu to select the appropriate values.

- Pools and hot tubs can be a major source of energy usage and must be included as well. Not factoring in these energy uses will skew the energy consumption analysis for the rest of the home.

Step 3: Complete Survey Of Household Characteristics

a.	Select closest weather location	WashingtonDC
b.	How many full-time occupants live in the household?	2
c.	Select approximate total conditioned floor area	2000
d.	Is supplemental electric heating present in the home?	Yes
e.	Does the home have air conditioning?	Yes
f.	Approximate Water Heater Setpoint	125 F - Medium
	Water Heater Fuel Type	Space Heating Fuel
	Approximate Efficiency	Regular Efficiency
g.	Cooking Fuel	Electricity
	How often do you use the oven/range to cook?	Moderately: 33%-50% of meals
h.	Dryer Fuel	Electricity
	How many loads per week on average?	3
i.	Is a pool present at the home?	No
	If so, what date does it open?	May 20
	If so, what date does it close?	Sep 5
	Pool surface shading level	0.3
	If so, how many hours per day does the pump run?	12
	What is horsepower (HP) of the pool pump?	1.00
j.	If a pool is present, is it heated?	No
	If heated, is the fuel type the same as space heating?	Same Fuel
	If fuel type is different, enter the annual fuel usage	1000
	..... enter fuel units	Gallons
	..... enter fuel type	Oil
	..... enter fuel unit price	$3.20
	Enter average temperature setpoint of pool (F)	82
	Enter approximate pool surface area (ft^2)	1,000
	Enter approximate pool heater efficiency (AFUE)	75%
	Base estimation of pool heating energy on:	Consumption Data

•If you collect customer's bills prior to your home assessment, consider asking additional questions on your customer lead form to allow for all data to be entered into these fields.

Step 3 *(cont.)*

- If you have questions about how these data entry fields affect energy usage, you may review the "Intermediate Supporting Calculations" section. For example, when the number of occupants increases, domestic hot water (DHW) usage also increases. By understanding these assumptions, you may be able to adjust certain data to obtain more accurate results.

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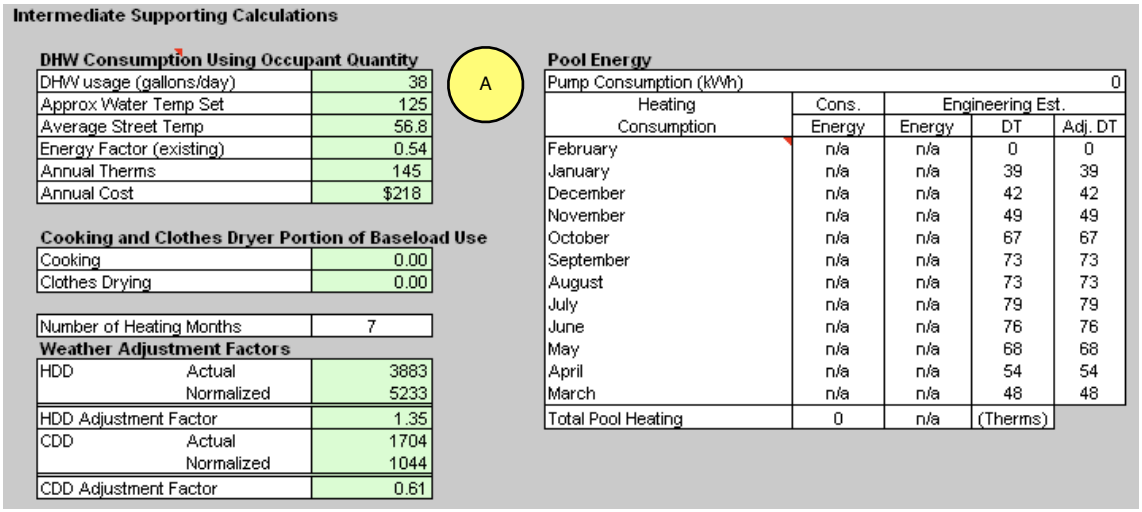

Intermediate Supporting Calculations

DHW Consumption Using Occupant Quantity

DHW usage (gallons/day)	38
Approx Water Temp Set	125
Average Street Temp	56.8
Energy Factor (existing)	0.54
Annual Therms	145
Annual Cost	$218

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Cooking and Clothes Dryer Portion of Baseload Use

Cooking	0.00
Clothes Drying	0.00

Number of Heating Months	7

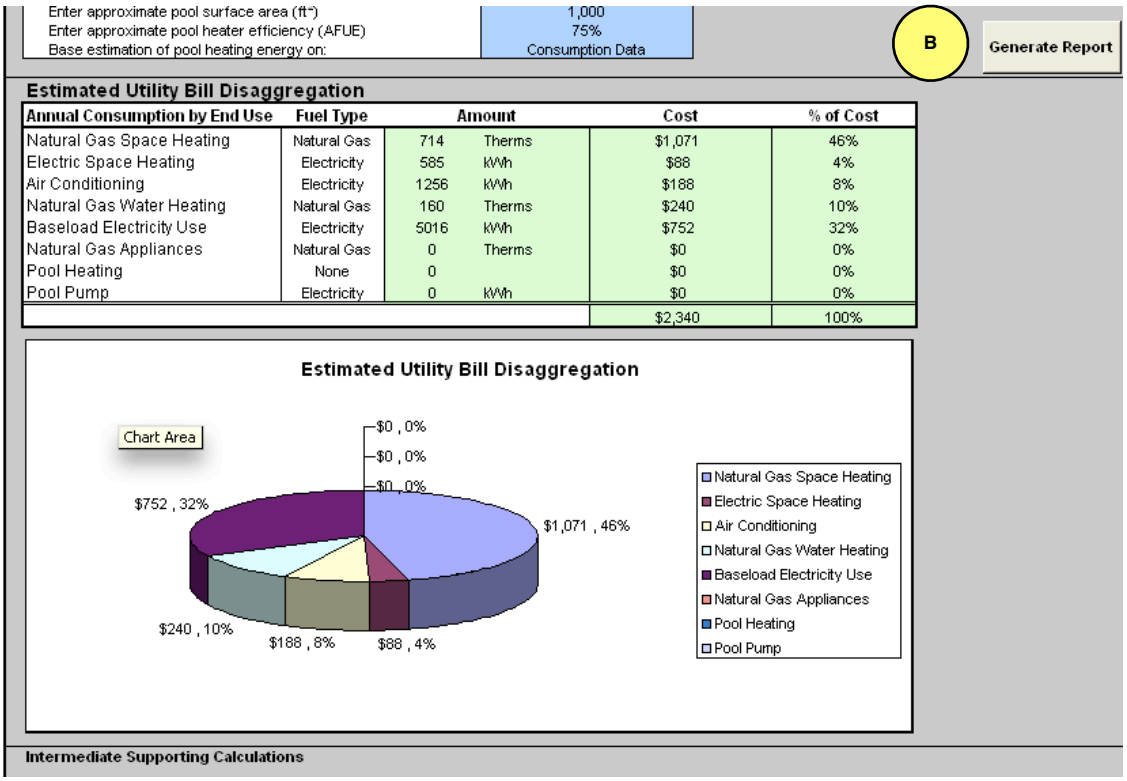
Weather Adjustment Factors

HDD	Actual	3883
	Normalized	5233
HDD Adjustment Factor		1.35
CDD	Actual	1704
	Normalized	1044
CDD Adjustment Factor		0.61

Pool Energy

Pump Consumption (kWh)				0
Heating Consumption	Cons. Energy	Engineering Est. Energy	DT	Adj. DT
February	n/a	n/a	0	0
January	n/a	n/a	39	39
December	n/a	n/a	42	42
November	n/a	n/a	49	49
October	n/a	n/a	67	67
September	n/a	n/a	73	73
August	n/a	n/a	73	73
July	n/a	n/a	79	79
June	n/a	n/a	76	76
May	n/a	n/a	68	68
April	n/a	n/a	54	54
March	n/a	n/a	48	48
Total Pool Heating	0	n/a	(Therms)	

- After all the household characteristics have been entered, the spreadsheet will automatically calculate the end use consumption data. Estimates for amount, cost, and percentage of energy used will be displayed. A pie chart displaying these percentages and costs is automatically generated for review.



Enter approximate pool surface area (ft²) 1,000
Enter approximate pool heater efficiency (AFUE) 75%
Base estimation of pool heating energy on: Consumption Data

B

Generate Report

Estimated Utility Bill Disaggregation

Annual Consumption by End Use	Fuel Type	Amount		Cost	% of Cost
Natural Gas Space Heating	Natural Gas	714	Therms	$1,071	46%
Electric Space Heating	Electricity	585	kWh	$88	4%
Air Conditioning	Electricity	1256	kWh	$188	8%
Natural Gas Water Heating	Natural Gas	160	Therms	$240	10%
Baseload Electricity Use	Electricity	5016	kWh	$752	32%
Natural Gas Appliances	Natural Gas	0	Therms	$0	0%
Pool Heating	None	0		$0	0%
Pool Pump	Electricity	0	kWh	$0	0%
				$2,340	100%

Intermediate Supporting Calculations

•After reviewing, select the "Generate Report" button to create a customized report to present to your customer.

B

A report will automatically be created based upon the data entry from the previous screen. You may alter this report to add further data or to make other changes.

- Add your company's information and the customer's information. (A)
- If applicable, clean up data points. In this example, we erased the pool information from the table and the pie chart. The pool references cannot be altered in the legend. You may also have to move data labels so they do not overlap. (B)
- The Home Energy Yardstick score provides your homeowner with an idea of how their home's efficiency compares with other homes in the United States. (C)